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(54) **FOLDING FLUE**

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(57) **ABSTRACT**

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The present invention relates to a folding chimney flue cap [1000] for fitting chimneys. The folding flue cap [1000] is manufactured as a flat body [1100] having an end panel [1140], a side panel [1160], another end panel [1150], and another side panel [1170], separated by fold lines [1180] between the panels. The folding chimney flue cap [1000] also includes top tabs [1120] above each of these panels. There are also bottom tabs [1130] below each of these panels. The flat body [1100] has a first connector part [1210] at one end and a second connector part [1220] on the other end. The folding flue cap [1000] may be readily shipped in its compact form and assembled into a box shape connecting first connector part [1210] to second connector part [1220]. The top tabs [1120] and the bottom tabs [1130] may be bent either inwardly or outwardly to better match the structures to which it would connect.

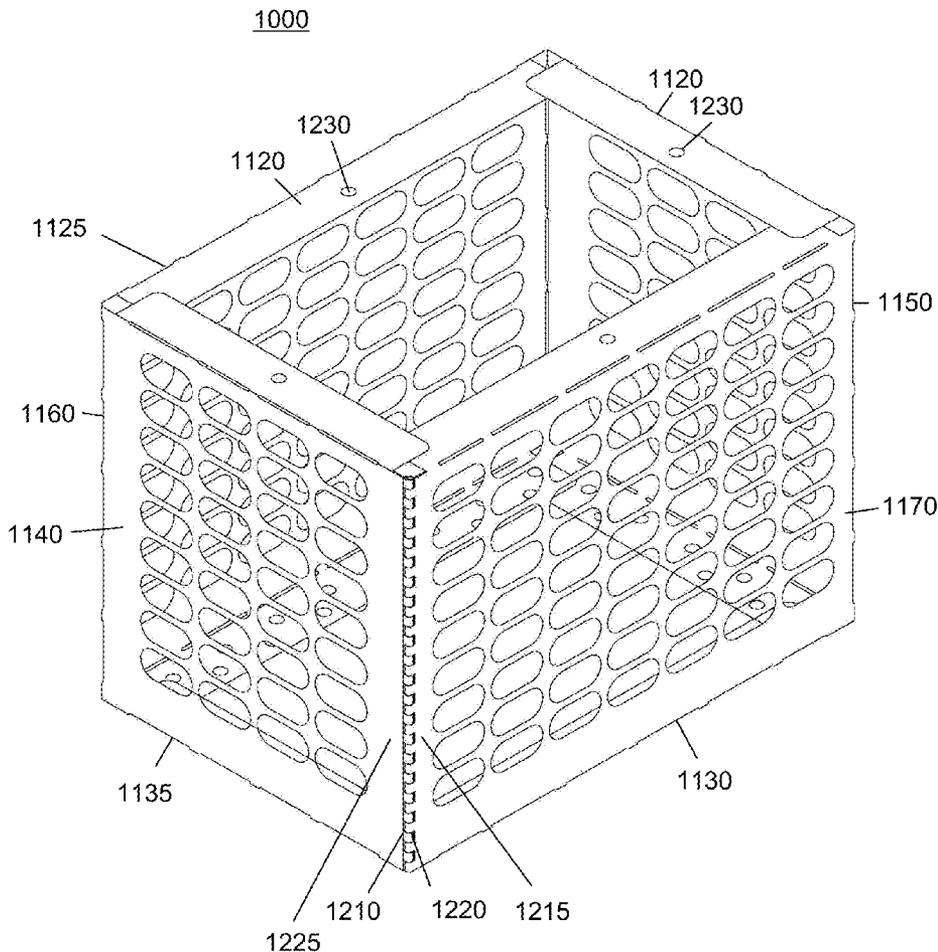
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Related U.S. Application Data

(60) Provisional application No. 60/997,276, filed on Oct. 2, 2007.



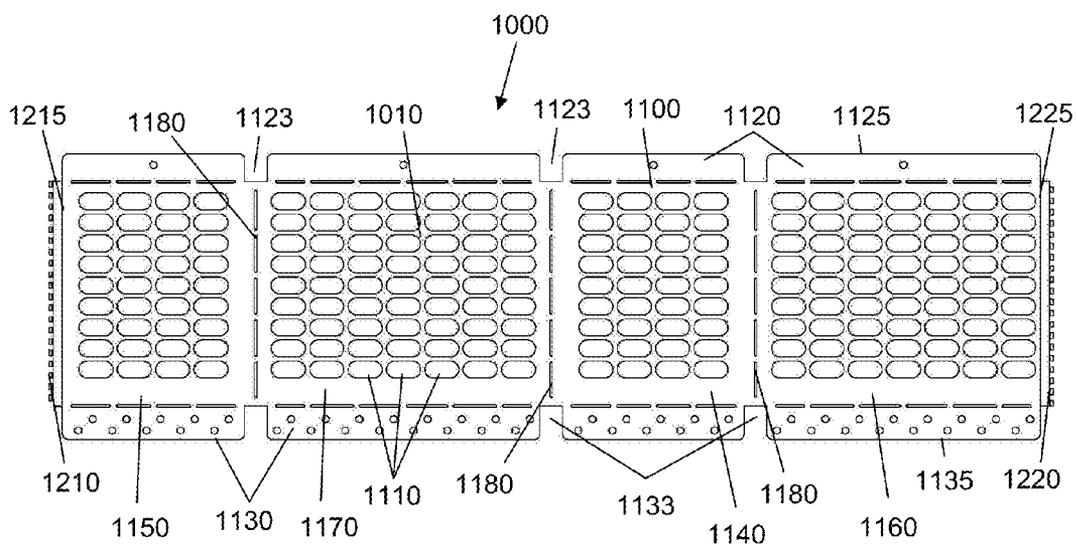


FIG. 1

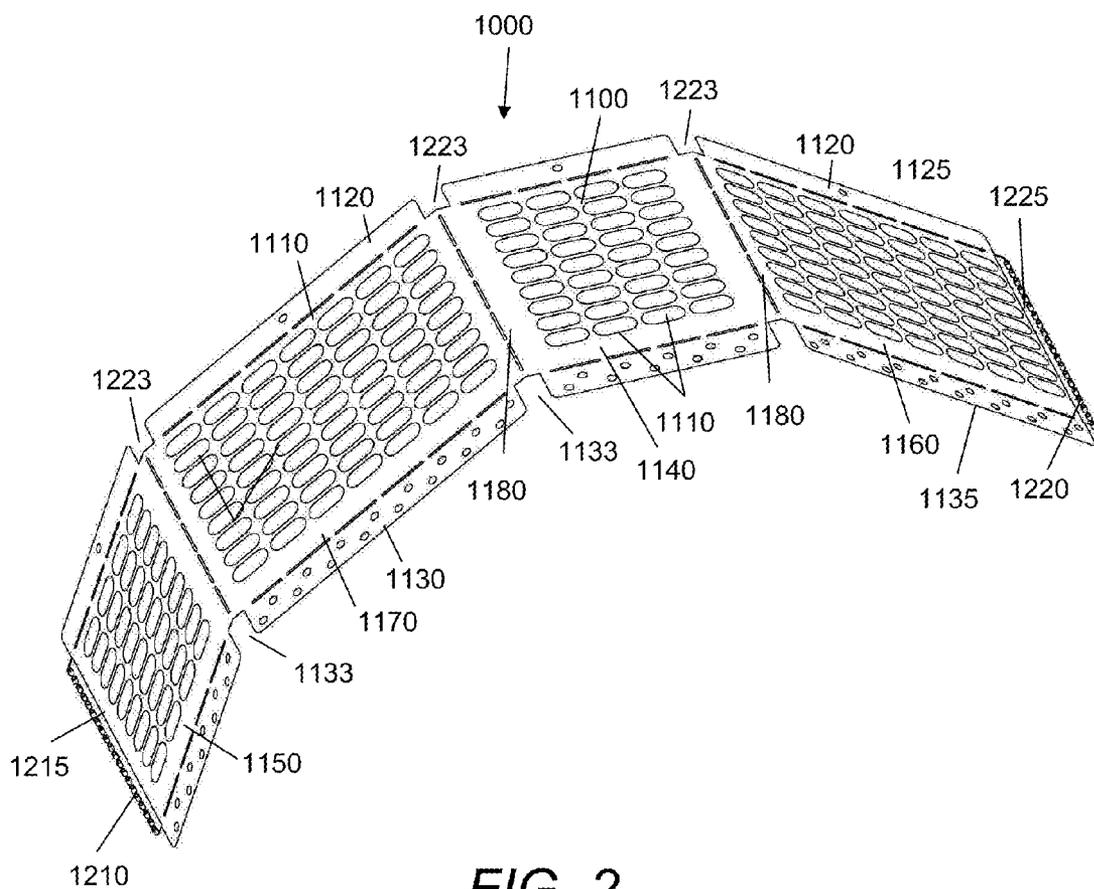


FIG. 2

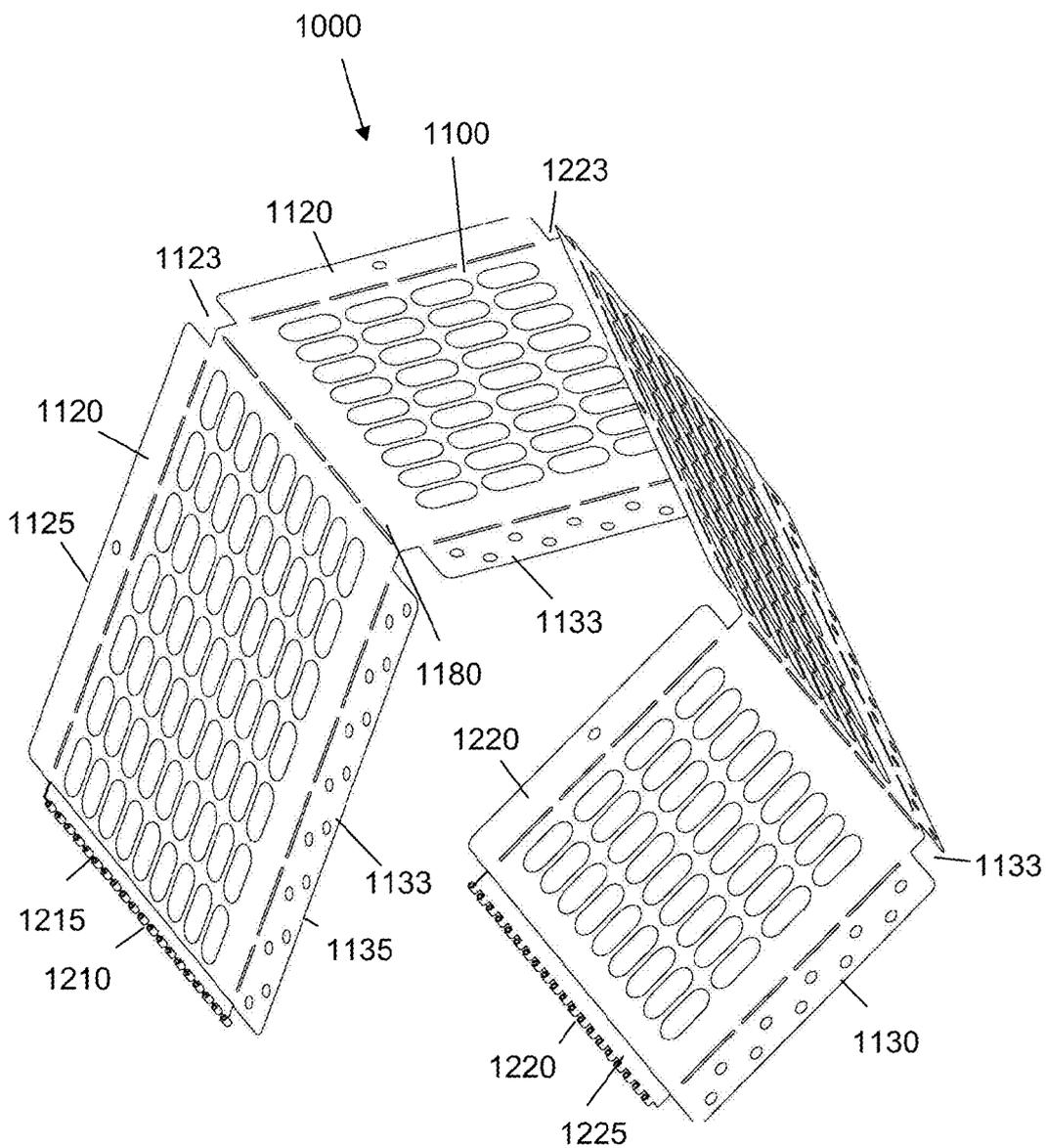


FIG. 3

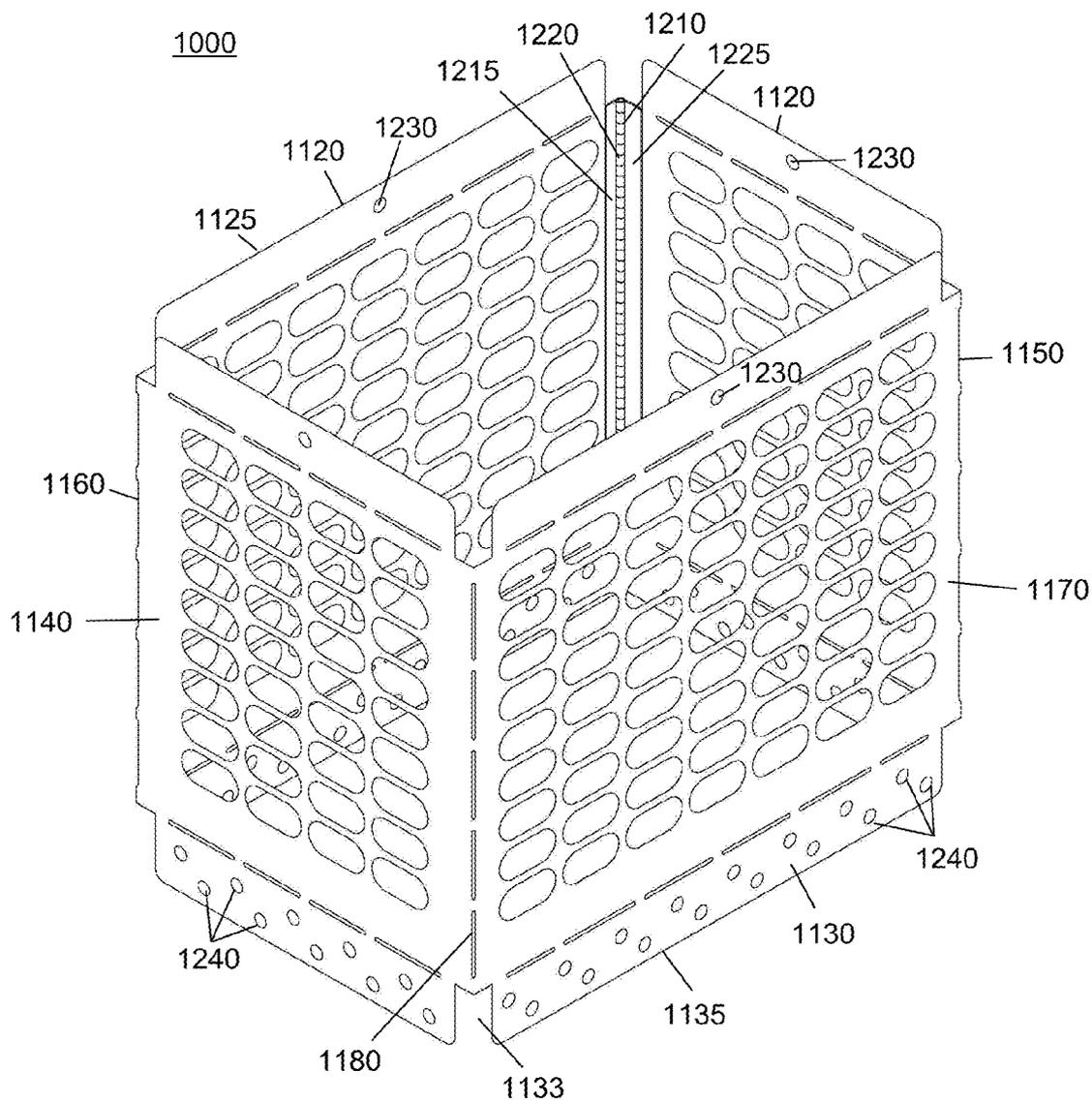


FIG. 4

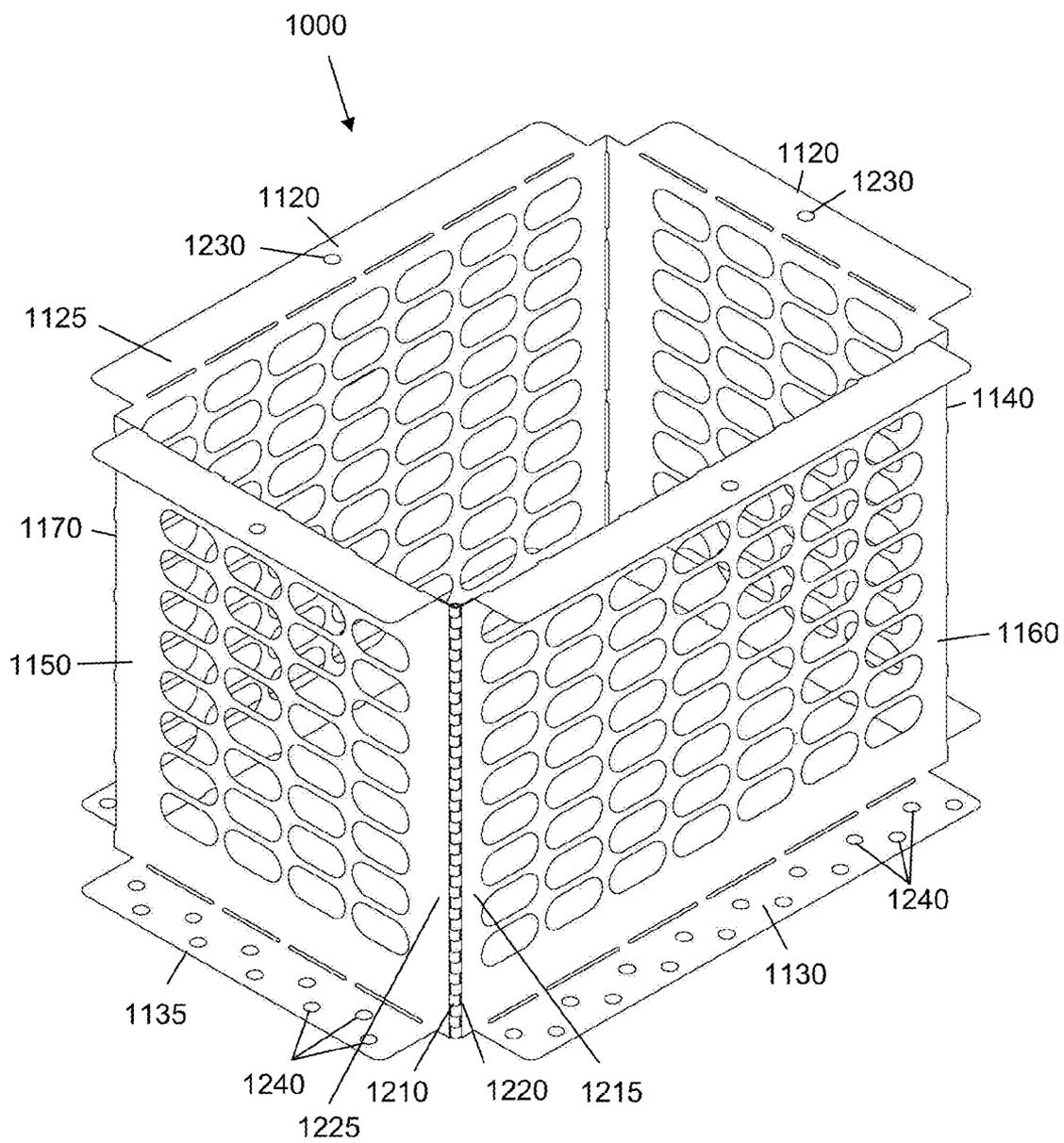


FIG. 5

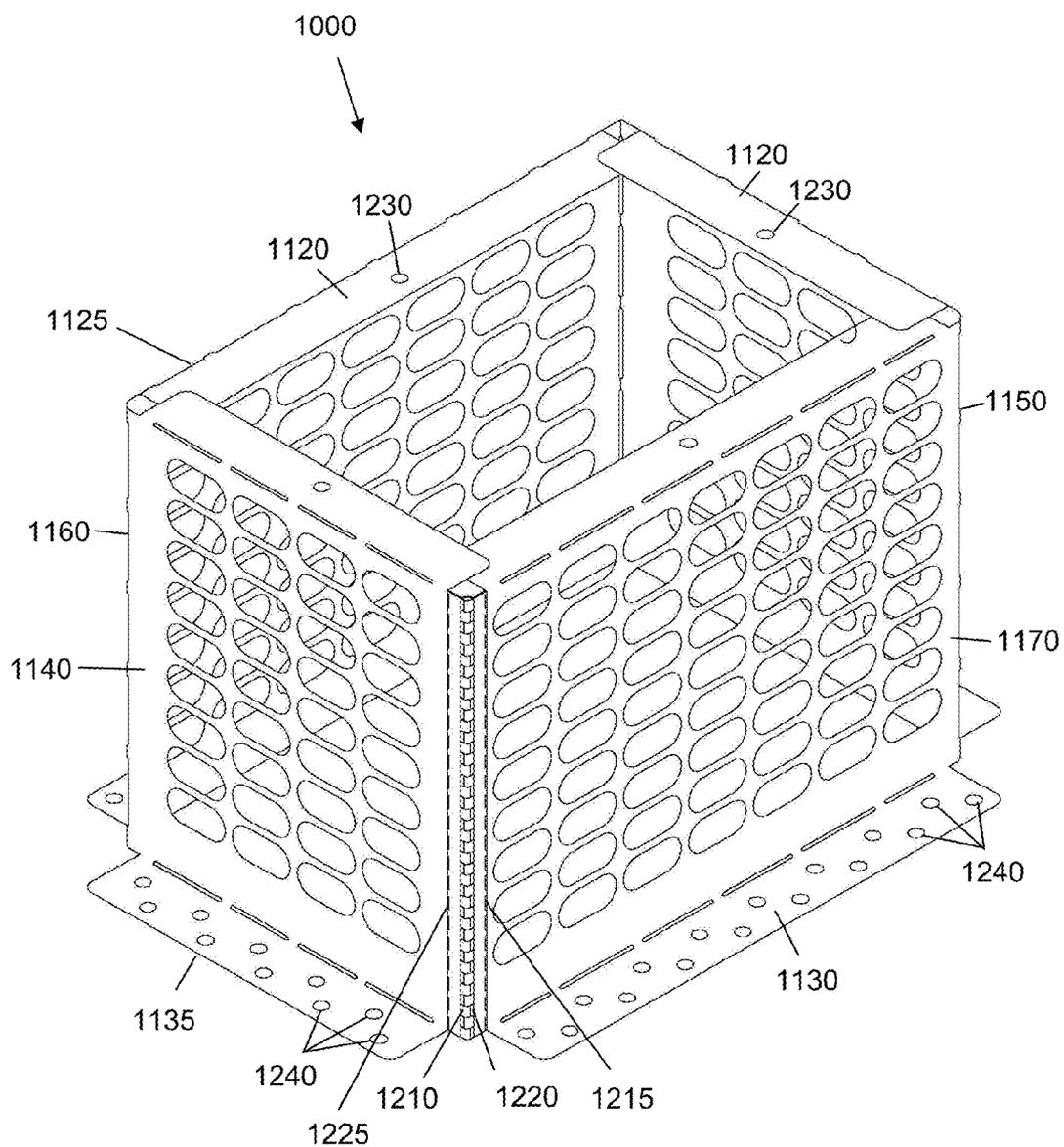


FIG. 6

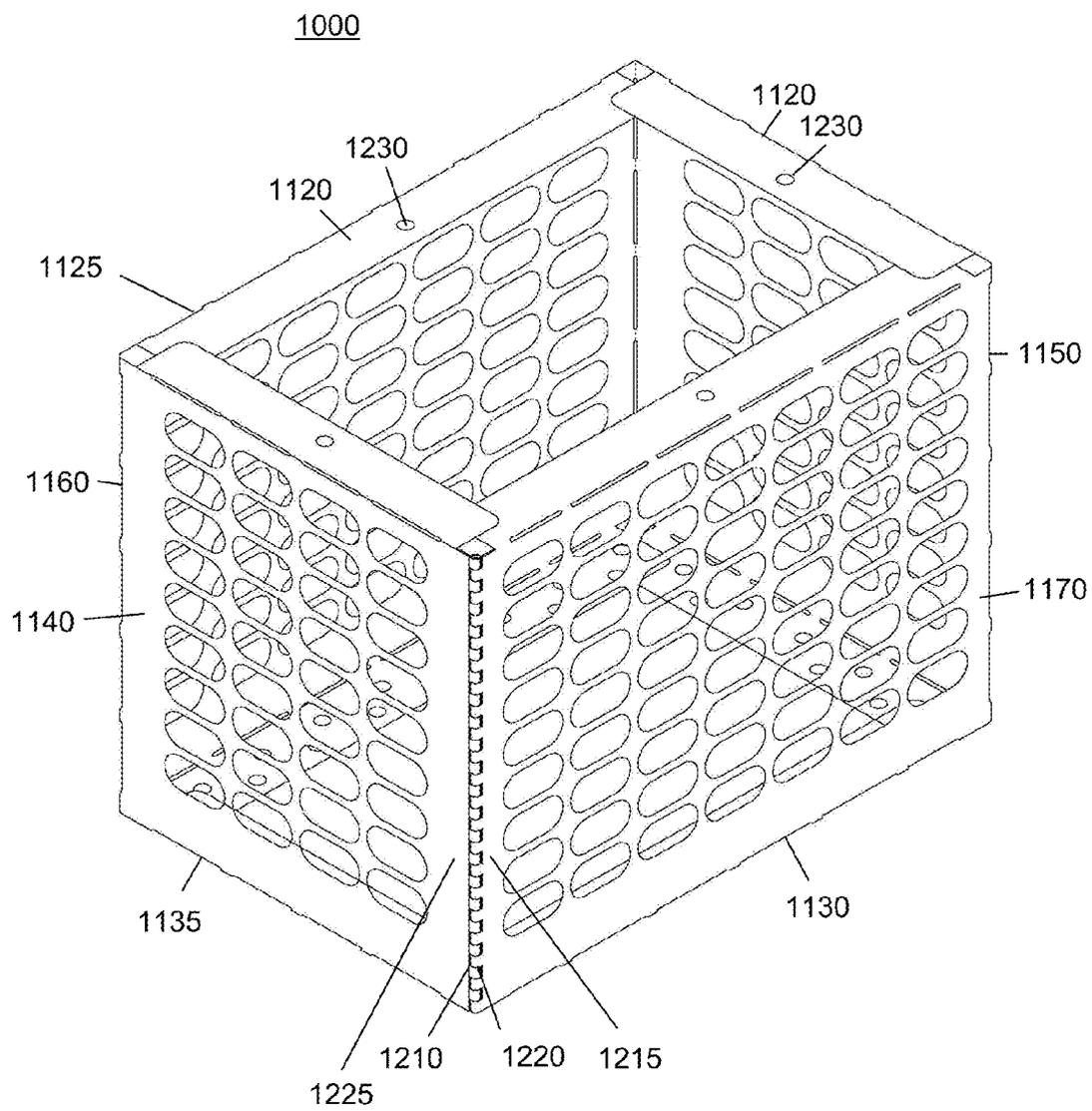


FIG. 7

FOLDING FLUE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority from U.S. Provisional Patent Application Ser. No. 60/997,276 "Folding Flue Cap" filed Oct. 2, 2007 by the same inventors as the present application, George W. Howard, Eric Depue, Ray Rerick. The present application claims priority from this application as if it were set forth in its entirety herein.

FEDERAL SPONSORED RESEARCH

[0002] Not Applicable

SEQUENCE LISTING OR PROGRAM

[0003] Not Applicable

BACKGROUND OF THE INVENTION

[0004] 1. Field of the Invention

[0005] The present invention relates to chimney flues and more specifically to foldable chimney flues.

[0006] 2. Discussion of Related Art

[0007] A chimney has an opening running its length for conveying exhaust gases from a fireplace, furnace or boiler acting as a heating source. Chimneys typically have a liner which runs from a furnace up through the chimney which exits on the roof. A top plate usually secures the liner to the chimney. A top flue cap or top cap may be attached to the opening of the top plate. The top cap usually functions to prevent objects from falling into the liner. Also, there may be a flue with vent holes between the top plate and the top cap. This allows for more exhaust.

[0008] Chimney flues are now made to order in various sizes and shapes. Typically these are ordered and sent through the mail. Most prior art flues were at least partially assembled and therefore large and bulky to mail to chimney installers.

[0009] Since they are typically large and bulky, they tend to be expensive to ship or send through the mail. This makes it economically unfeasible to ship them to remote locations.

[0010] Also, it is beneficial to reduce the cost of manufacturing the flue caps. Chimney installers are constantly looking to cut costs by not sacrificing quality.

[0011] Currently there is a need for a chimney flue which is more economical to manufacture and more economical to ship.

SUMMARY OF THE INVENTION

[0012] A compact folding chimney flue vent [1000] comprising:

[0013] a substantially flat body [1100] having a first end and a second end, the body [1100] also having:

[0014] a) a plurality of vents [1110] through it;

[0015] b) a plurality of fold lines [1180] dividing the body [1100] into a plurality of panels;

[0016] c) a first connector part [1210] capable of attaching to a second connector part [1220], the first connector part [1210] attached to one end of the flat body [1100];

[0017] d) a second connector part [1220] connected to the second end of the flat body [1100], such that when the flat body [1100] is folded on the fold lines [1180], a geometric shape is formed and the first connector [1210] connects to the second connector [1220].

OBJECTS OF THE INVENTION

[0018] It is an object of the present invention to produce a chimney flue which is more economical to manufacture.

[0019] It is another object of the present invention to produce a chimney flue which is more economical to ship through the postal system.

[0020] It is another object of the present invention to provide a chimney flue which requires fewer parts.

[0021] It is another object of the present invention to provide a chimney flue which is easier to mass produce.

[0022] It is another object of the present invention to provide a chimney flue which is more compact in its unassembled state.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] The advantages of the instant disclosure will become more apparent when read with the specification and the drawings, wherein:

[0024] FIG. 1 is a plan view of one embodiment of a folding flue according to the present invention as it would be shipped.

[0025] FIG. 2 is a perspective view of the folding chimney flue of FIG. 1 in its partially assembled position.

[0026] FIG. 3 is a perspective view of the folding chimney flue of FIGS. 1-2 in a nearly assembled position.

[0027] FIG. 4 is a perspective view of the folding chimney flue of FIGS. 1, 2 and 3 in its folded position where first connector part [1210] is locked to its second connector part [1220].

[0028] FIG. 5 is the chimney flue as shown in FIGS. 1-4 as it would appear in its fully assembled position with its top and bottom tabs folded outward, ready to be mounted to an existing chimney.

[0029] FIG. 6 is the chimney flue as shown in FIGS. 1-4 in its fully assembled position with its top tabs folded inward and bottom tabs folded outward ready to be mounted to an existing chimney structure.

[0030] FIG. 7 is the chimney flue as shown in FIGS. 1-4 in its fully assembled position with its top tabs folded inward to be mounted to an existing chimney, and its bottom tabs also folded inward to better attach to certain existing chimney structures.

DETAILED DESCRIPTION OF THE INVENTION

[0031] FIG. 1 is a plan view of one embodiment of a folding flue according to the present invention as it would be shipped. A body [1100] is shown in its unfolded flat view. Body [1100] has vent holes [1110] cut into it.

[0032] Body [1100] has stamped or perforated or otherwise weakened fold lines [1180]. Fold lines [1180] are a narrow area of reduced strength. These fold lines [1180] are typically constructed by running a roller blade over a metal sheet thereby producing indentations and a thinned area. Here they are created by cutting slots. When a sheet having a fold line [1180] is bent, it tends to bend at the fold line [1180] and not elsewhere on the sheet.

[0033] Body [1100] has several fold lines [1180] which separate it into end panels [1140, 1150], and side panels [1160, 1170]. Each of these panels has a top tab [1120] and a bottom tab [1130].

[0034] A first connector part [1210] is attached to one end of body [1100] and a second connector part [1220] is attached to the other end of body [1100]. First connector part [1210] and second connector part [1220] are designed to connect to each other when body [1100] is fully folded.

[0035] These connectors may be insert tabs, twist tabs, nuts and bolts, screws or any other known fasteners.

[0036] Top tabs [1120] are separated by top slots [1123] making them independent. Also bottom tabs [1130] may be separated by bottom slots [1133].

[0037] In an alternative embodiment, top tabs [1120] may be replaced by another attachment structure.

[0038] In an alternative embodiment, bottom tabs [1130] may be replaced by another attachment structure.

[0039] FIG. 2 is a perspective view of the folding chimney flue of FIG. 1 in its partially assembled position. End panel [1150] and side panel [1160] can be seen with a fold line [1180] between these panels. Between side panel [1170] and end panel [1140] is another fold line [1180].

[0040] Finally, between end panel [1140] and side panel [1160] there is another fold line [1180].

[0041] In this view, first connector part [1210] is not yet connected to second connector part [1220].

[0042] First connector part [1210] and second connector part [1220] are typically two-part fasteners which are supplied by a third-party manufacturer. One such fastener is a hinge having two parts which interlink with a hinge pin passing through both connector part pieces.

[0043] Hinges add to the cost of manufacturing the flue, so using hinges at all four corners thereby increases costs. Fold lines [1180] between these sides makes a very inexpensive and sturdy joint. This construction reduces the number of expensive connector joints developed by third parties.

[0044] FIG. 3 is a perspective view of the folding chimney flue of FIGS. 1-2 in a nearly assembled position. Here it can be seen that the fold lines [1180] allow body [1100] to fold into flat panels and create a box shape.

[0045] FIG. 4 is a perspective view of the folding chimney flue cap of FIGS. 1, 2 and 3 in its folded position where first connector part [1210] is locked to its second connector part [1220].

[0046] This makes a connection between side panel [1160] and end panel [1150].

[0047] The folding flue [1000] is shown here with top tabs [1120] and bottom tabs [1130] still extending vertically. Here it can be seen that there are four top connectors [1230] in the top tabs [1120] for attachment to a chimney top cap.

[0048] Also, there are a plurality of bottom connectors [1240] in the bottom tabs [1130]. These will be used for attaching the folding flue [1000] to a roof structure.

[0049] FIG. 5 is the chimney flue as shown in FIGS. 1-4 as it would appear in its fully assembled position with its top and bottom tabs [1120, 1130] folded outward, ready to be mounted to an existing chimney. This view is rotated 180 degree from the view of FIG. 4 showing first and second connector parts [1210, 1220] in the front.

[0050] It can be seen here that bottom tabs [1130] are folded outward to be attached to an existing chimney structure, such as a top plate. Therefore, bottom connections [1240] can accommodate attachment points of a top plate which are larger than the folding flue [1000].

[0051] Again, bottom connections [1240] may be used to attach the folding flue [1000] to other roof structures.

[0052] Since these are being bent by the person installing the flue cap, they may be bent to an optimum angle that matches the pitch of a roof structure to which it is being attached.

[0053] Similarly, top tabs [1120] may be bent to the optimum position to attach to a chimney top cap. It can be seen here that top tabs [1120] are folded outward to be attached to an existing chimney structure, such as a top cap. Therefore, top connections [1230] can accommodate attachment points of a top cap which are larger than the folding flue [1000].

[0054] FIG. 6 is the chimney flue as shown in FIGS. 1-4 in its fully assembled position with its top tabs [1120] folded inward and bottom tabs [1130] folded outward ready to be mounted to chimney structures.

[0055] Top tabs [1120] are folded inward to better accommodate connection to a smaller chimney top cap and a larger top plate.

[0056] FIG. 7 is the chimney flue cap as shown in FIGS. 1-4 in its fully assembled position with its top tabs [1120] folded inward to be mounted to an existing chimney cap, and its bottom tabs [1130] also folded inward to better attach to existing roof structures.

[0057] In an alternative embodiment top tabs [1120] and bottom tabs [1130] can be bent in any direction which more closely adapts to structures to which it attaches.

[0058] This adaptability is not possible with many prior art chimney flues which are preformed having tabs or a lip which extend outward or inward. Prior art flues are not designed to be adjusted to accommodate different sized top plates and top caps.

[0059] In alternative embodiment of FIG. 1, end panel [1150] and side panel [1170] of FIG. 1 are folded back onto side panel [1160] and end panel [1140] to create a double layer item half of the length. This item is twice as strong as the flat embodiment shown in FIG. 1 and half as long. This embodiment is easier to store and ship.

[0060] Once it is received at its final location, the installer will bend this into the proper shape for installation.

[0061] Although preferred embodiments have been described, other embodiments and modifications of the invention are intended to be covered by the spirit and scope of the present application.

What is claimed is:

1. A compact folding chimney flue [1000] comprising:

- a) a substantially flat body [1100] having a first end and a second end, the flat body [1100] having:
- b) a plurality of fold lines [1180] dividing the body [1100] into a plurality of panels [1140, 1150, 1160, 1170];
- c) a first connector part [1210] capable of attaching to a second connector part [1220], the first connector part [1210] attached to one end of the flat body [1100];
- d) a second connector part [1220] connected to the second end of the flat body [1100], such that when the flat body [1100] is folded on the fold lines [1180], a geometric shape is formed and the first connector part [1210] connects to the second connector part [1220].

2. The compact folding chimney flue [1000] of claim 1 wherein:

at least one of the panels [1140, 1150, 1160, 1170] has a plurality of vents [1110] and the flue acts as a flue vent.

3. The compact folding chimney flue [1000] of claim 1 wherein:

- the connector parts [1210, 1220] have loops which intertwine and receive an elongated rod which holds the loops together.
- 4. The compact folding chimney flue [1000] of claim 1 wherein:
 - the connector parts [1210, 1220] are other known means for attaching metal parts.
- 5. The compact folding chimney flue [1000] of claim 1 wherein:
 - the top tabs [1120] are adapted to fold inward toward a center of the folding flue to move top connections 1230 inward to fit various top caps.
- 6. The compact folding chimney flue [1000] of claim 1 wherein:
 - the top tabs [1120] are adapted to fold outward away from a center of the folding flue to move top connections [1230] outward to fit various other top caps.
- 7. The compact folding chimney flue [1000] of claim 1 wherein:
 - the bottom tabs [1130] are adapted to fold inward toward a center of the folding flue to move bottom connections [1240] inward to fit various top plates.
- 8. The compact folding chimney flue [1000] of claim 1 wherein:
 - the bottom tabs [1130] are adapted to fold outward away from a center of the folding flue to move bottom connections [1240] outward to fit various top plates.
- 9. The compact folding chimney flue [1000] of claim 1 wherein:
 - the top tabs [1120] are adapted to fold to an angle and stay at that angle to attach to angled surfaces of chimney structure surfaces.
- 10. The compact folding chimney flue [1000] of claim 1 wherein:
 - the bottom tabs [1130] are adapted to fold to an angle and stay at that angle to attach to angled surfaces of chimney structure surfaces.
- 11. A method of providing a compact chimney flue to a remote location at lower cost than prior art methods, comprising steps of:
 - a) providing flat body [1100] with a plurality of panels [1040, 1050, 1060, 1070], the panels being serially connected, and separated by weakened fold lines, and having a first end [1215] and a second end [1225], the first end [1215] and second end [1225] being capable of being connected together;
 - b) shipping the flat plate to a remote location;

- c) at the remote location, folding the flat body [1100] on each of the fold lines [1180] to cause the first end [1215] to come in contact with the second end [1225]; and
 - d) connecting the first end [1215] to the second end [1225] to create a chimney flue [1000].
12. The method of providing a compact chimney flue to a remote location of claim 11 wherein the step of providing a flat body comprises the step of:
- providing flat body [1100] with a plurality of panels [1140, 1150, 1160, 1170], the panels being serially connected, and separated by weakened fold lines, and having a first end [1215] and a second end [1225], the first end [1215] and second end [1225] being capable of being connecting together.
13. A compact plate capable of being folded into a chimney flue [1000] comprising:
- a) a flat body [1100] having a plurality of vent openings, a first end [2325] and a second end [1225], a top edge [1125] and a bottom edge [1135], a plurality of panels [1140, 1150, 1160, 1170] having fold joints [1180] between adjacent panels;
 - b) first connector part [1210] on the first end [1215] of the flat plate; and
 - c) second connector part [1220] on the second end [1225] of the flat plate capable of securing the first connector part [1210] when the flat plate is folded on its fold joints [1180] creating a chimney flue [1000];
 - d) adjustable top tabs [1120] capable of fitting various top caps; and
 - e) adjustable bottom tabs [1130] capable of fitting various top plates.
14. The compact plate of claim 13 wherein the fold joint [1180] is:
- a perforated fold line.
15. The compact plate of claim 13 wherein the fold joint [1180] is:
- an indentation line between two adjacent panels.
16. The compact plate of claim 13 wherein the fold joint [1180] is:
- a weakened section between two adjacent panels.
17. The compact plate of claim 13 wherein:
- at least two of the panels fold on top of two other panels to result in a double strength, smaller item to ship.

* * * * *